EPA's Comments on Draft Proposed Site Specific Criteria for Chuit River and Three Tributaries: Loading Analysis for Downstream Protection

January 8, 2015

The Alaska Department of Environmental Conservation (ADEC) provided draft water quality standards (WQS) revisions and supporting draft decision documents to the U.S. Environmental Protection Agency (EPA) for review on July 30, 2014. The proposed WQS revisions would apply to specified waters in the Chuitna basin and include site-specific criteria (SSC) for four metals and revision of the agricultural use. EPA provided comments on the draft documents for ADEC's consideration on December 12, 2014, but deferred comments on the discussion of downstream protection to a later date (Section D of the December 12, 2014 comments). The following comments address the loading analysis that ADEC and Pac Rim completed to evaluate downstream protection.

ADEC indicated that a downstream protection evaluation for the manganese SSC will be completed at a future date (Section III B ii, page 27 of the July 25, 2014 draft decision document). The following comments for the aquatic life SSC may also apply to the downstream evaluation for manganese if a similar approach is used, and additional comments may be provided after EPA has had the opportunity to review the downstream evaluation for manganese.

Overall, EPA commends ADEC for completing a loading study to evaluate the protectiveness of the SSC for aluminum, copper, and zinc to downstream waters. EPA recently issued a decision tool for downstream water quality protection to assist states and tribes to evaluate and quantify potential impacts of water quality criteria to downstream waters. This decision tool is located at the following website: http://cfpub.epa.gov/wqsits/downstream-protection-tool/. Downstream protection modeling is an evolving area and EPA appreciates that ADEC completed an analysis that EPA and the State can further discuss and refine.

Site-Specific Criteria Used for Copper and Zinc

The draft proposed WQS amendment for the SSC and the supporting decision document provide final SSC values for copper and zinc that are based on a hardness of 25 mg/L as CaCO3. These draft proposed SSC values are not hardness-based and would apply to the waters without adjustment. However, the criteria used for copper and zinc for the downstream loading analysis appear to be generated by applying the proposed WER to the Alaska criteria after adjusting for hardness. This results in lower criteria than the proposed SSC because the measured or predicted hardness in the waters is generally less than 25 mg/L. As a result, the loading rates are lower than they would be if the draft proposed SSC were used.

This comment is intended for consideration in conjunction with comment IV of EPA's December 12, 2014 comments, which raised questions about the protectiveness of SSC for copper and zinc that are based on a hardness of 25 mg/L. The approach of calculating

instantaneous SSC without a low hardness cap, as was done for the downstream analysis, would be more protective than basing the SSC on the hardness value of 25 mg/L. In any case, the downstream evaluation should use the SSC that are proposed in the accompanying decision document.

Adjustment of the Loading Rate for Percent Effluent Discharge

The draft decision document for the SSC states: "The preliminary loading analysis used a broad conservative assumption that 50 percent of the total flow in project area streams would be from effluent discharges with dissolved copper concentrations at 95% of the proposed chronic SSC." The loading prediction tables in Tetra Tech's 12/17/2013 technical memorandum re: *Loading Analysis* include the following statement under the table titles: "Assumes that Total Stream Flow at Discharge is 50 percent effluent." (Lower effluent flow rates are assumed during storm events for copper in Table 7.) This assumption appears to be reflected in the metals concentration entries in the predicted loadings tables, i.e., Tables 4B, 5B, 6B, and 7, which are proportionally less than the SSC. The reduced concentrations are then converted to loading rates and carried through the downstream analysis.

This approach is based on the idea that the mine effluent is near the SSC concentration and that it is diluted by the cleaner tributary water to a value lower than the SSC. However, the assessment question for the SSC is: Does allowing the tributary concentration to go up to the SSC concentration, which is what would be allowed by the SSC, push the mainstem over the statewide criterion? To answer this question, the tributary metal concentrations should be set to the SSC values, not flow-adjusted values. Put another way, we are not evaluating a NPDES permit limit equal to the SSC, but rather the effect of allowing the entire tributary to have a metal concentration at the SSC.

ADEC's approach to the loading analysis would be consistent with a NPDES permit that does not allow a mixing zone. In this case, the effluent would meet the SSC at the point of discharge and the receiving water would in effect dilute the discharge to a level below the SSC. EPA recommends discussion with ADEC on this topic.

Scope of Available Data

According to TetraTech's 12/17/2013 loading analysis memo, none of the sampling events represent a low-probability event. The return periods for the high and low flow events are 1 year and 1 to 2 years, respectively. Are additional data now available that could be used to expand the temporal scope of the analysis to a return frequency that approximates the "frequency of exceedance" component of the SSC? Please see comment number VI in EPA's 12/12/2014 comments.

Application of the Aluminum SSC

The description of the waters to which the aluminum SSC will apply may be incorrect in the draft proposed decision document. The decision document states (page 18), "...the proposed SSC will include the lower Chuit River (between the confluence of Lone Creek and the tidewater terminus) as well as the three tributaries." The confluence of Lone Creek with Chuit River is downstream of Bass Creek, so this description excludes the reach of Chuit River between the confluence of Bass Creek and Lone Creek. Page 10 of the decision document includes a similar description. However, according to the draft proposed WQS amendment for the SSC, the SSC for aluminum and manganese will apply in the Chuit River lower main stem "From Confluence of Bass Creek to the tidewater terminus," not from Lone Creek. This discrepancy should be resolved.